

Response to First Office Action  
Docket No. 011.0262.US.UTL

### REMARKS

Claims 1-34 are pending and remain in the application. Claims 1 and 6 have been amended. No new matter has been introduced.

5 Claims 1, 2, 6, and 7 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,532,020 issued to Friedman et al. ("Friedman"). Applicant traverses the rejection.

A claim is anticipated under 35 U.S.C. §102(e) only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. MPEP § 2131. The Friedman reference fails to  
10 describe, either expressly or inherently, each and every claim element of, and therefore does not anticipate, Claims 1, 2, 6, and 7.

The Friedman patent describes a custom luminance sensitive palette that comprises colors on a plurality of luminance levels consisting of colors of uniform luminance (Abstract). Friedman addresses two problems encountered in  
15 attempting to maximize the quality of a color image at a give color resolution. First, given a reduced number of colors  $N$ , design an optimal palette  $P$  to be used in displaying any arbitrary image  $I$  with maximum possible fidelity to the original image. Second, given an arbitrary image  $I$  and a fixed palette  $P$ , represent the image  $I$  using only colors from  $P$ . Friedman teaches an invention that "maximizes  
20 the color quality of images reproduced at lower color resolutions by using a single, carefully designed color palette. To avoid palette wars and the additional computational overhead associated with adaptive palette methods, the present invention utilizes the same palette in the reproduction of all images" (emphasis added) (Col. 4, lines 30-35). Friedman also teaches an improved rendering  
25 method that includes luminance emphasized mapping (Col. 6, lines 11-13).

Thus, Friedman teaches designing general color palettes for arbitrary images. Colors in a fixed, previously-derived palette, known as the Uniform Luminance Level (ULL) palette, are selected to represent a given pixel in an image to be displayed, even though image quality may be lowered (Col. 4, lines  
30 46-55; Col. 8, lines 21-32; Col. 10, lines 20-54). Friedman also teaches using the

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eye's ability to merge neighboring pixels into a single color to represent colors that are not explicitly available in the ULL palette (Col. 3, lines 20).

In contrast, independent Claims 1 and 6 respectively define a system and method for determining a natural color depth of a digital image. The natural color  
5 depth is the minimal number of colors needed to represent a digital image without affecting visual perception (Spec., page 2, line 30-page 3, line 1). The invention addresses the problem of, given an arbitrary image *I*, determining the natural color depth of the image, that is, finding the minimum number of colors necessary to represent that image with no perceptual loss of quality to the viewer. This  
10 problem is unrelated to designing a universal color palette to be used to avoid palette wars, per the teachings of Friedman, and is also unrelated to problems addressing dithering, error diffusion, and color reduction. Rather, the claims define taking a digital color image that is typically stored in higher quality than is necessary and removing redundant information by only using as many colors as is  
15 necessary for that particular image. Image quality is preserved and the size of the color palette only reduced, if at all, as necessary to remove visually imperceptible color redundancies.

More particularly, independent Claim 1 recites a merge module selecting a closest neighboring color for each color in the color palette separated by a  
20 substantially minimum color distance, and merging, in iterative sequence, *the colors* in each color pair that *are visually indistinct* (emphasis added). Similarly, independent Claim 6 recites selecting a closest neighboring color for each color in the color palette separated by a substantially minimum color distance, and merging, in iterative sequence, *the colors* in each color pair that *are visually*  
25 *indistinct* (emphasis added). Only colors that are *already* in the color palette are selected and merged if the two colors are "visually indistinct," that is, two unique colors that cannot be recognized as visually distinct in the image. Visually indistinct is a function of the distance between the colors in color space, the distance between the colors physically in the image, and the size of the largest  
30 contiguous area of each of the particular colors. Consequently, the amendments

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to Claim 1 clarify that the colors are merged if the colors, not the luminance level of the colors, are visually indistinct. Such limitations are neither taught nor suggested by Friedman.

Support for the claim amendments can be found in the specification on  
5 page 11, line 14 through page 12, line 31. In particular, the example function *merge(x, y)* takes color pair *x* and *y* as input parameters and returns a merged color *z*, while the example function *visually\_distinct(x, y)* takes the same color pair *x* and *y* as input parameters and returns *true* if the colors are visually distinct and *false* if they are not.

10 Claim 2 is dependent on Claim 1 and is patentable for the above-stated reasons, and as further distinguished by the limitations recited therein. Claim 7 is dependent on Claim 6 and is patentable for the above-stated reasons, and as further distinguished by the limitations recited therein. Withdrawal of the rejection under 35 U.S.C. §102(e) is respectfully requested.

15 Claims 3-5 and 8-11 stand subject to objection as being dependent upon a rejected base claim. Claims 3-5 are dependent on Claim 1 and are patentable for the above-stated reasons, and as further distinguished by the limitations recited therein. Claims 3-10 are dependent on Claim 6 and are patentable for the above-stated reasons, and as further distinguished by the limitations recited therein.

20 Claim 11 is multiply dependent on Claims 6, 7, 8, 9, or 10 and is patentable for the above-stated reasons, and as further distinguished by the limitations recited therein. Withdrawal of the objection is respectfully requested.

25 The prior art made of record and not relied upon has been reviewed by the applicant and is considered to be no more pertinent than the prior art references already applied.

Examination and further consideration of the application is respectfully requested. Claims 12-34 are allowed. Claims 1-11 are believed to be in a condition for allowance. Entry of the foregoing amendments is requested and a Notice of Allowance is earnestly solicited. Please contact the undersigned at

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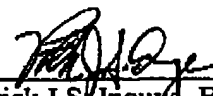
(206) 381-3900 regarding any questions or concerns associated with the present matter.

Respectfully submitted,

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Dated: March 1, 2005

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